REMARKS

Applicant appreciates the Examiner's thorough consideration provided the present application. Claims 1, 7, 9, 11, 12, 15, 16, 23-25, 27, 29, 36, 37, 40, 44, 45 and 47-49 are now present in the application. Claims 1 and 29 have been amended. Claim 28 has been cancelled. Claims 1 and 29 are independent. Reconsideration of this application, as amended, is respectfully requested.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 7-9 11, 12, 14, 27, 29, 36, 37, 40, 44 and 46-49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Reber, U.S. Patent No. 6,110,748, in view of Gordon, U.S. Patent No. 5,892,577, and further in view of Virtanen, U.S. Patent No. 6,342,349. Claims 15 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Reber in view of Gordon and Virtanen, and further in view of Dermers, WO 98/12599. Claims 23-25, 28, and 45 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Reber in view of Gordon and Virtanen, and further in view of Ekins, Clinical Chemistry, Vol. 37, no 11, pp. 1955-1967. These rejections are respectfully traversed.

As mentioned, independent claims 1 and 29 have been amended to incorporate the subject matter of previously presented claim 28. In particular, independent claims 1 and 29 recite "the first light beam is adapted to provide a light spot having a diameter between 20-150μm on the specimen." The Examiner stated that it would be obvious to combine Reber, Gordon, Virtanen and Ekins in order to arrive at this claimed feature. Applicant respectfully disagrees.

Reber does not explicitly nor implicitly disclose *a scanning control means.*

Reber uses a disc storage medium both for the reaction he studies and also for the information he can read and write. It is completely clear that Reber directs the operation of the positioning mechanism 42, 44, 46 and 48, the data reader *48,* the data reader 34, the detector *38,* and the data writer 40 to collect data from "a plurality of sites" and to write data to the device. The term "a plurality of sites" means discrete positions known a priori in Reber's context. In fact, Reber does not scan the disc in order to find where on the disc the tagged molecules are present. The detector is moved from one known position a to another known position b without doing any observation during the movement. The Examiner is using exactly the term "site" meaning in Reber's context, the specific discrete location, where a reaction can take place.

Applicant agrees that moving from point x_0, y_0 with increments Δx, Δy will bring the observer to $x_0+\Delta x$, yo+Δy. This is exactly what Reber does with known predetermined Δx, Δy to a new known position.

The Examiner pointed exactly to the central feature in Reber – "To arrange the detector 38 at a known position of a desired site to collect data in a sequential manner or in a random access manner." Please note, that sequential vs. random access only refers to the order in which the various known positions are accessed and processed.

Applicant also agrees that knowing the name of a person is not the same as the knowing the location (address) of the person. In Reber and Virtanen, the inventors are basically visiting predetermined addresses in a city and asking who is living there, and how the person's condition is.

In the present invention, it is more like that there is a search for a missing person, where the person can be recognized on his appearance only, *i.e.* a needle in a haystack. Thus, the present invention relates to scanning of a specimen in order to identify a target object in the specimen without any prior knowledge of the position of the target object. The present invention provides the scanning control means that provide position data when a target object is identified by the detector in order to store data sets comprising position data and detector data. Thereby it is possible to retrieve position data in order to arrange a microscope at the position of a detected target object, allowing a user to study the target object in greater details. Therefore, Reber does not disclose a scanning control means as defined by the present claims, i.e. scanning control means adapted for providing position data to a storage, wherein the position data is part of a data set also including detector data of the target object.

Microscope

Contrary to the statements of the Examiner, neither Gordon nor Virtanen allows for arranging a conventional microscope at the position of a target object. In both references, the light source and the detector are located on the arm traveling radially in relation to the specimen, and the references describe that said arm corresponds to the radially traveling arm in a CD player. A microscope arranged in either of the documents would have to follow the movements of said arm in order to be placed at the position of the target object. One skilled in the art would not arrange a conventional microscope on the arm corresponding to the radially traveling arm in a CID player. Therefore, there is no motivation to combine Reber, Gordon and Virtanen, and consequently to lead to a system and a method as defined by the present claims.

Light spot size

Applicant respectfully submits that one skilled in the art knows that Ekins cannot be combined with Reber, Gordon and Virtanen, because the dimensions of the light spot in amended claim 1 does not allow an image to be formed in Gordon and Virtanen, as explained hereinbelow.

Generally, a microscope, such as the microscope according to claim 1 and 29, is used to record an image instantly without any scanning means, thereby allowing the user to study the object. There are several ways of forming images as follows:

Classical image forming devices

Images (in the sense morphological information) can be formed in various ways. The most obviously is known from classical optics, where a pin-hole (or a lens) is forming an image on a plate for direct observation by the eye, or an image is formed in a virtual plane and observed through a lens by the eye. The first is the case, when a camera is used either directly, the second when forming an image of the virtual magnified image plane in a microscope. In both cases the image is formed instantly on the photographic plate on the retina in the eye.

Scanning methods for forming images

Another way of creating the same information is known from television sets, where an electronic beam is scanned under modulation over a fluorescent screen. Due to the storage and delay function in the eye, this is experienced as an image. It is simple to conclude, that recording of the information can also be done be recording the modulation from a small area at a time, and combine these signals into the same information as the instant image will contain.

The resolution of an image

Using any electromagnetic radiation the resolution of an image is limited by the wavelength of the radiation and the numerical aperture of the image forming device (the lens) following this formula:

$$Y\text{-}0.61*\lambda(n*\sin\theta) \text{ for non-coherent light}$$

Where $n*\sin\theta$ is the numerical aperture (n.a.)of the lens, and λ is the light wavelength. Two objects with a separation on less than Y will be seen as one object in the microscope. (Reference: *Principles of Optics, Electromagnetic Theory of Propagation Interference and Diffraction of Light*, Sixth Edition, Max Born & Emil Wolf, Pergamon Press.)

A good microscope lens typically has an n.a. on 0.40. Using green fluorescent non-coherent scattered light (Wavelength λ = 520 nm), the resolution becomes:

$$Y\sim 0.61 *520/0.4 \text{ nm} = 793 \text{ nm}$$

Consequently, two objects with a separation less than 793 nm will be seen as one object in the microscope. If a scanning system should provide the same resolution, it would be necessary to use a spot size on significantly less than 793 nm in both directions in the plane. Thus, the resolution for a scanning system depends on the light spot size on the specimen being scanned.

In order to image of the cells, the light spot size must be significantly smaller than the cell size; otherwise information of the cell shape cannot be obtained. Biological cells are typical in the range of 5-15 μm. Thus, a light spot having a diameter between 20-150 μm cannot be used in a scanning system for imaging cells, wherein "imaging" means providing shape and morphology of the cell.

In the present invention, it is therefore necessary to use an optical microscope for performing a detailed examination of the marked objects, such as observing the morphology of the objects, while the scanning process of the present invention is only providing information on the presence of the object. Therefore, implementing a light spot diameter of 20-150 μm in Virtanen would destroy the possibility of using the scanning method to provide an image of the cell. Accordingly, one skilled in the art will not combine Reber and Ekins, and then further combine with Gordon and Virtanen. If the light spot diameter of Ekins were introduced into the combination of references, then the system of Virtanen could not function as a scanning confocal laser microscope.

Consequently, the combination of these four references does not lead one skilled in the art to the claimed features in claim 1 and 29.

With regard to the Examiner's reliance on Dermers, this reference has only been relied on for its teachings related to the dependent claims of the present invention. This reference also fails to disclose the above combination of the elements and steps as set forth in amended independent claims 1 and 29. Accordingly, this reference fails to cure the deficiencies of Reber, Gordon, Virtanen or Ekins.

Accordingly, none of those references individually or in combination teach or suggest the limitations of amended independent claims 1 and 29. Therefore, Applicant respectfully submits that claims 1 and 29 and their dependent claims clearly define over the teachings of the references relied on by the Examiner.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103 are respectfully requested.

CONCLUSION

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Joe McKinney Muncy, Registration No. 32,334 at (703) 205-8000 in the Washington, D.C. area to conduct an interview in an effort to expedite prosecution in connection with the present application.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicants respectfully petition for a one (1) month extension of time for filing a response in connection with the present application and the required fee is attached herewith.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By _____

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